



## MOC3051 / MOC3052

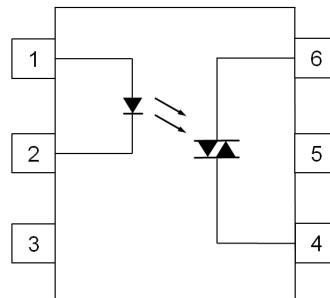


### DESCRIPTION

The MOC3051 and MOC3052 are optically coupled isolators consisting of a Gallium Arsenide infrared emitting diode coupled with a light activated silicon bilateral switch performing the functions of a triac.

These photocouplers provide random phase control of high current triacs or thyristors. The MOC3051 and MOC3052 feature greatly enhanced static dv/dt capability to ensure stable switching performance of inductive loads.

These devices are mounted in a standard 6 pin dual-in-line package.



- 1 Anode
- 2 Cathode
- 3 NC
- 4 Main Terminal
- 5 Substrate (Do not Connect)
- 6 Main Terminal

### FEATURES

- High Repetitive Peak Off-state Voltage  $V_{DRM}$  : minimum 600V
- High Critical Rate of Rise of Off-state Voltage  $dv/dt$  : minimum 1000V/ $\mu$ s )
- High Isolation Voltage between Input and Output  $V_{iso}$  : 5000Vrms
- Lead Free and RoHS Compliant
- UL File No. E91231
- VDE File No. 40028086

### APPLICATIONS

- Solenoid / Valve Controls
- Lamp Ballasts
- Static AC Power Switch
- Interfacing Microprocessors to 115 and 240Vac Peripherals
- Solid State Relays
- Incandescent Lamp Dimmers
- Temperature Controls
- Motor Controls

### ORDER INFORMATION

- Add Suffix "X" for VDE Approval
- Add G after PN for 10mm lead spacing
- Add SM after PN for Surface Mount
- Add SMT&R after PN for Surface Mount Tape & Reel

### ABSOLUTE MAXIMUM RATINGS ( $T_A = 25^\circ\text{C}$ )

Stresses exceeding the absolute maximum ratings can cause permanent damage to the device. Exposure to absolute maximum ratings for long periods of time can adversely affect reliability.

#### Input

Forward Current	50mA
Reverse Voltage	6V
Power dissipation	100mW

#### Output

Peak Repetitive Surge Current (Pulse width = 1ms, 120pps)	1A
Off State Output Terminal Voltage	600V
Power Dissipation	300mW

#### Total Package

Isolation Voltage	5000V <sub>RMS</sub>
Total Power Dissipation	330mW
Operating Temperature	-40 to 100 °C
Storage Temperature	-55 to 150 °C
Lead Soldering Temperature (10s)	260°C

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**MOC3051 / MOC3052**

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise specified)

**INPUT**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Forward Voltage	$V_F$	$I_F = 20\text{mA}$		1.2	1.5	V
Reverse Current	$I_R$	$V_R = 6\text{V}$		0.05	10	$\mu\text{A}$

**OUTPUT**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Peak Off-state Current Either Direction	$I_{\text{DRM}}$	$V_{\text{DRM}} = 600\text{V}$ $I_F = 0\text{mA}$ Note 1			100	nA
On-State Voltage Either Direction	$V_{\text{TM}}$	$I_{\text{TM}} = 100\text{mA (peak)}$			3.0	V
Critical Rate of Rise of Off-State Voltage	dv/dt	$I_F = 0\text{mA}$	1000			V/ $\mu\text{s}$

**COUPLED**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Input Trigger Current Either Direction	$I_{\text{FT}}$	$V_{\text{TM}} = 3\text{V}$ Note 2 MOC3051 MOC3052			15 10	mA
Holding Current Either Direction	$I_{\text{H}}$			200		$\mu\text{A}$

**ISOLATION**

Parameter	Symbol	Test Condition	Min	Typ.	Max	Unit
Insulation Voltage	$V_{\text{ISO}}$	AC 1 minute, RH 40 to 60% Note 3	5000			$V_{\text{RMS}}$

Note 1 : Test Voltage must be applied within static dv/dt rating.

Note 2 : Guaranteed to trigger at an  $I_F$  value less than or equal to max  $I_{\text{FT}}$ ,  
recommended  $I_F$  lies between Rated  $I_{\text{FT}}$  to Absolute Max  $I_F$ .

Note 3 : Measured with input leads shorted together and output leads shorted together.

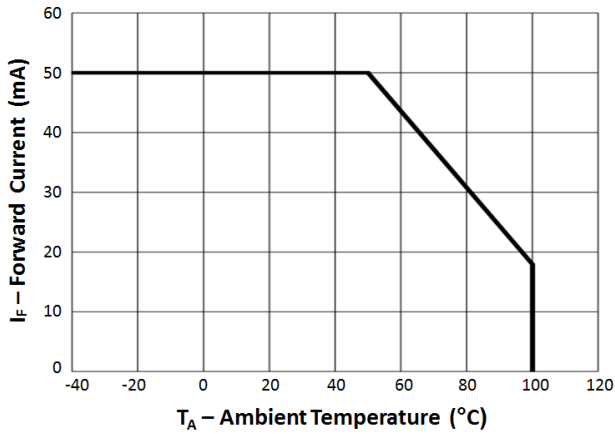


Fig 1 Forward Current vs Ambient Temperature

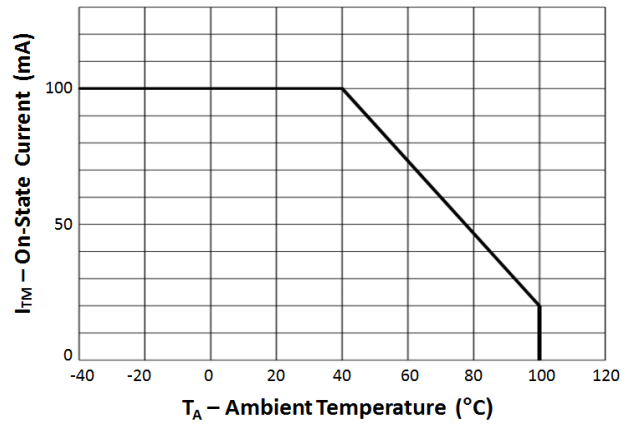


Fig 2 On-State Current vs Ambient Temperature

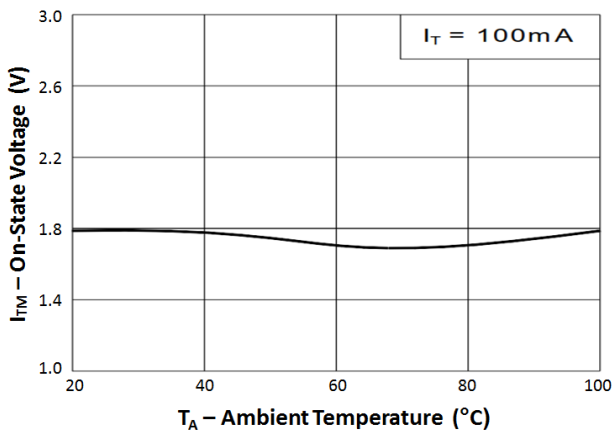


Fig 3 On-State Voltage vs Ambient Temperature

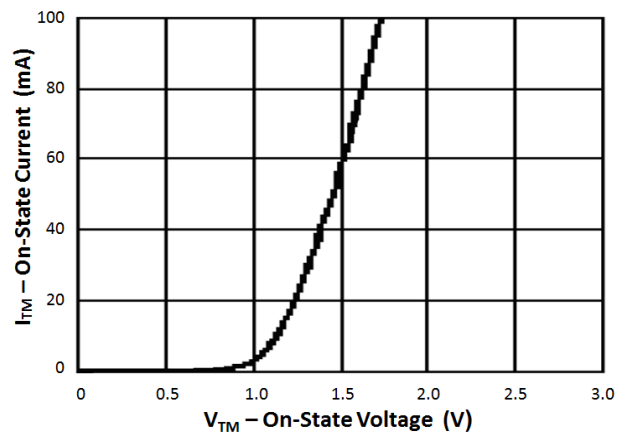


Fig 4 On-State Current vs On-State Voltage

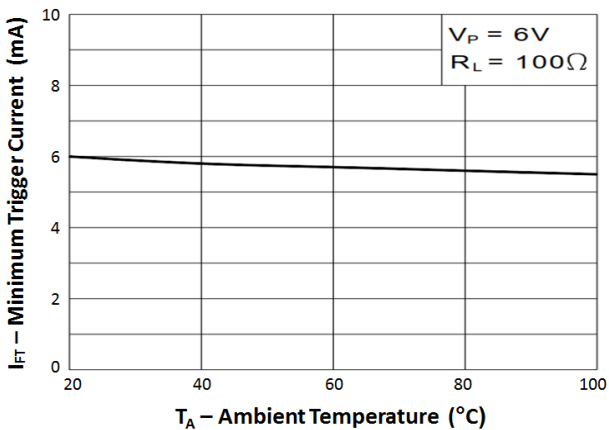


Fig 5 Minimum Trigger Current vs Ambient Temperature

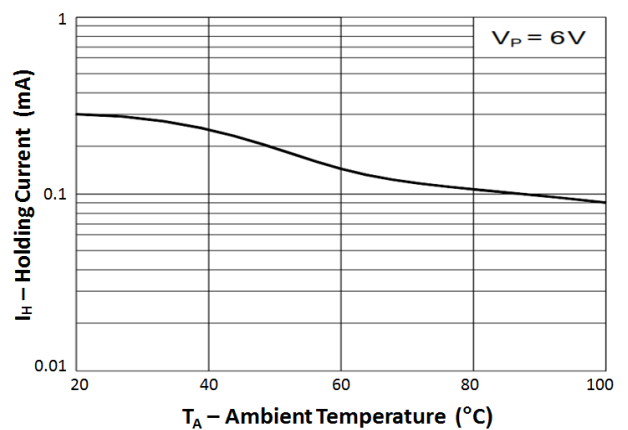


Fig 6 Holding Current vs Ambient Temperature

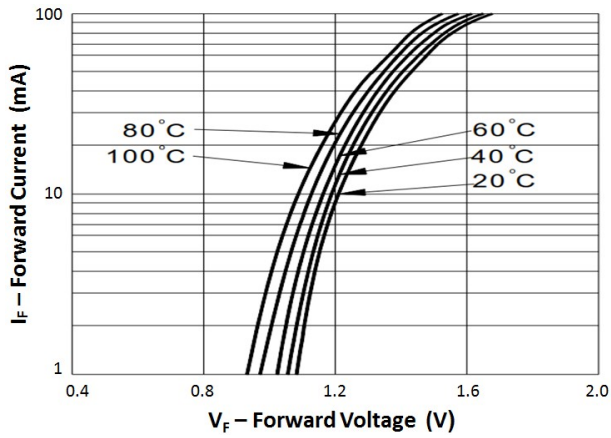


Fig 7 Forward Current vs Forward Voltage

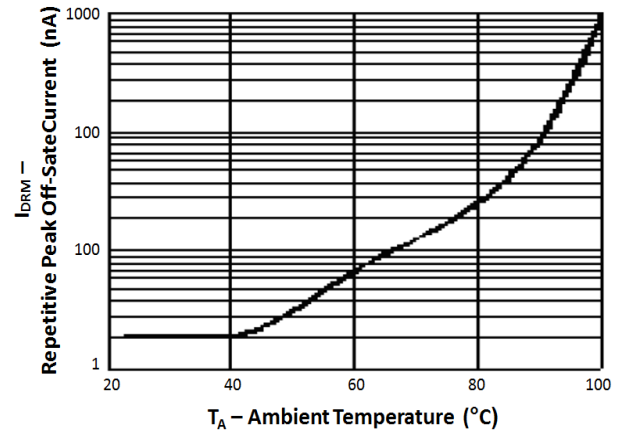


Fig 8 Repetitive Peak Off-State Current vs Ambient Temperature



**MOC3051 / MOC3052**

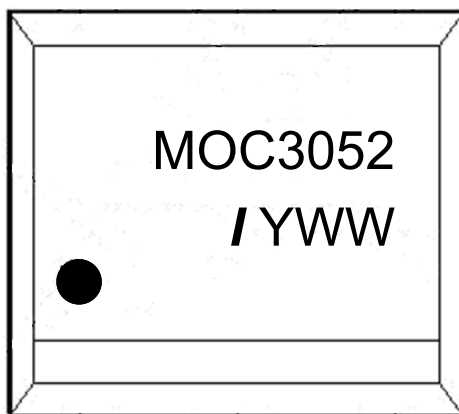
**ORDER INFORMATION**

<b>MOC3051 / MOC3052 (UL Approval)</b>			
<b>After PN</b>	<b>PN</b>	<b>Description</b>	<b>Packing quantity</b>
None	MOC3051, MOC3052	Standard DIP6	65 pcs per tube
G	MOC3051G, MOC3052G	10mm Lead Spacing	65 pcs per tube
SM	MOC3051SM, MOC3052SM	Surface Mount	65 pcs per tube
SMT&R	MOC3051SMT&R, MOC3052SMT&R	Surface Mount Tape & Reel	1000 pcs per reel

<b>MOC3051X / MOC3052X (UL Approval and VDE Approvals)</b>			
<b>After PN</b>	<b>PN</b>	<b>Description</b>	<b>Packing quantity</b>
None	MOC3051X, MOC3052X	Standard DIP6	65 pcs per tube
G	MOC3051XG, MOC3052XG	10mm Lead Spacing	65 pcs per tube
SM	MOC3051XSM, MOC3052XSM	Surface Mount	65 pcs per tube
SMT&R	MOC3051XSMT&R, MOC3052XSMT&R	Surface Mount Tape & Reel	1000 pcs per reel

**DEVICE MARKING**

**Example : MOC3052**



MOC3052 denotes Device Part Number

I denotes Isocom

Y denotes 1 digit Year code

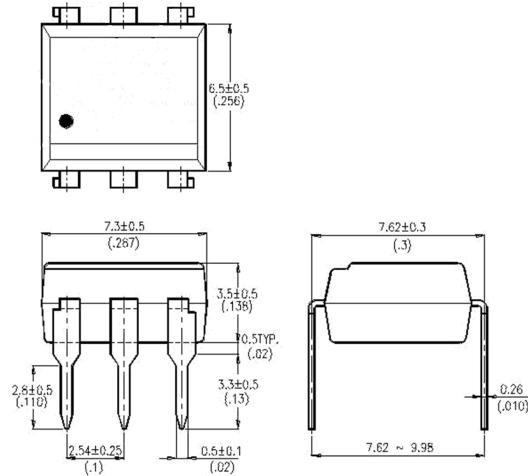
WW denotes 2 digit Week code



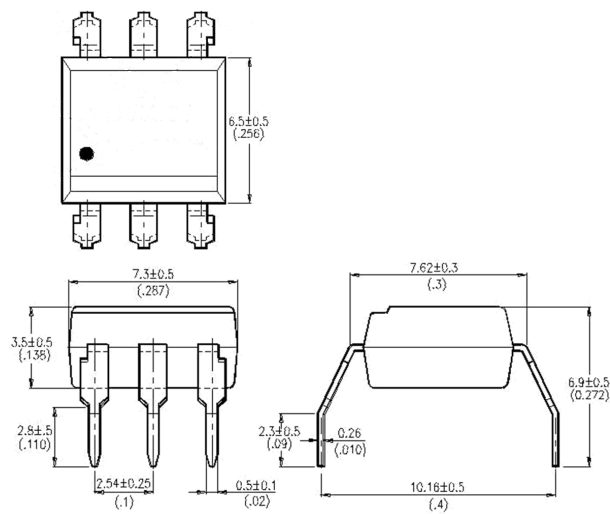
**MOC3051 / MOC3052**

**PACKAGE DIMENSIONS in mm (inch)**

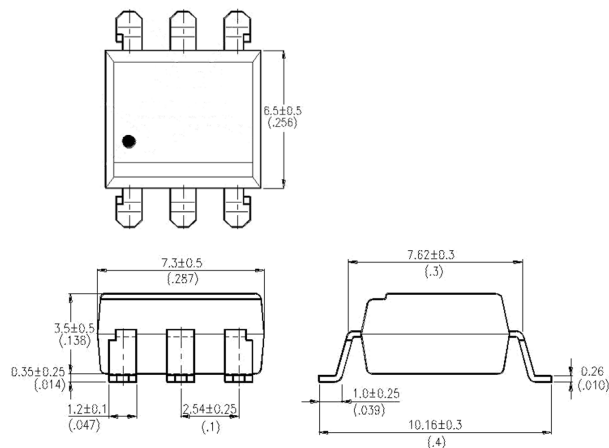
**DIP**



**G Form**



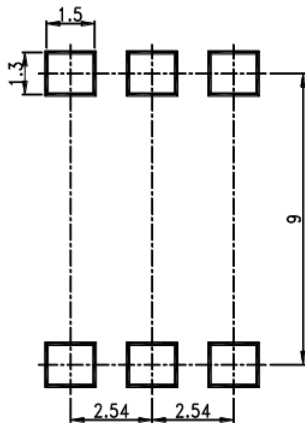
**SMD**



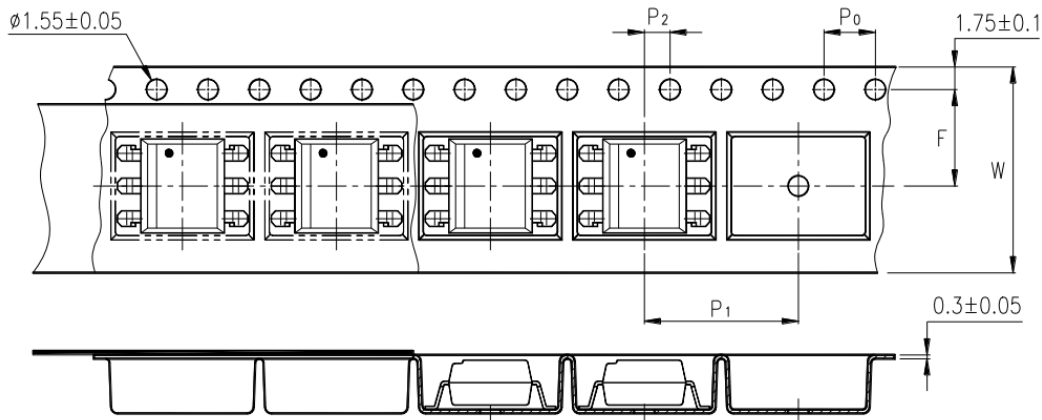


**MOC3051 / MOC3052**

**RECOMMENDED PAD LAYOUT FOR SMD (mm)**



**TAPE AND REEL PACKAGING**

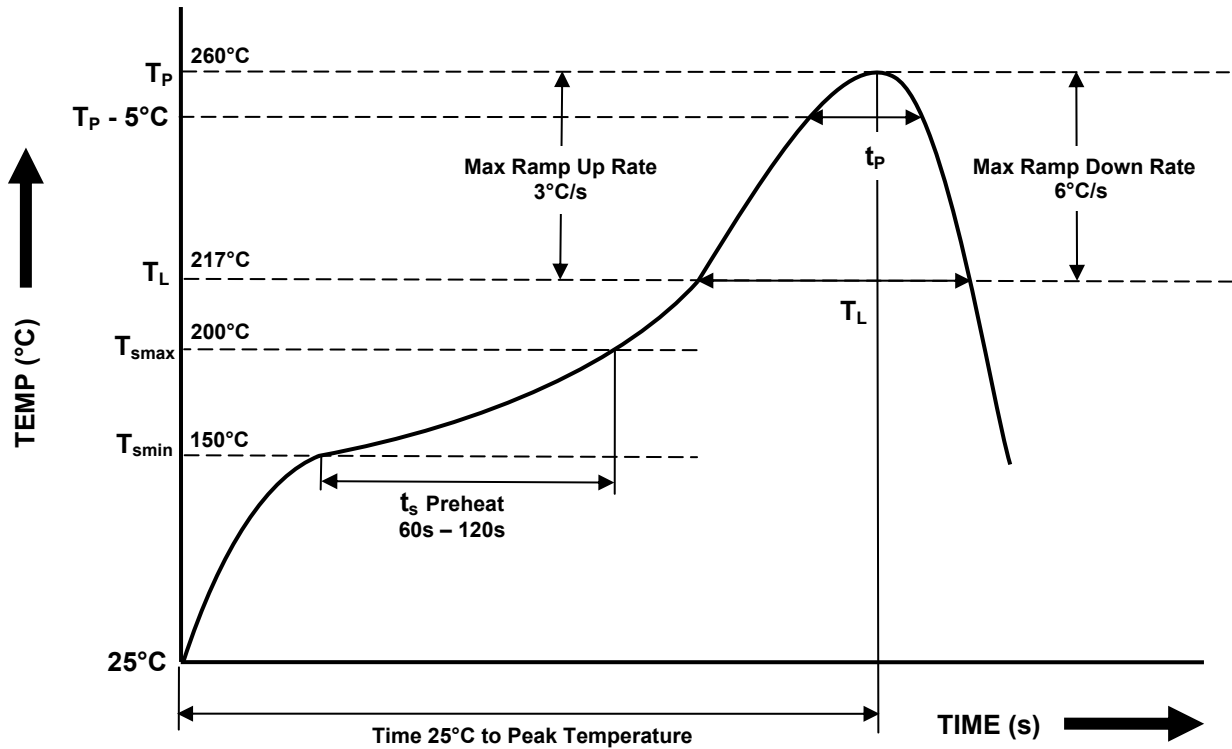


Description	Symbol	Dimension mm (inch)
Tape Width	W	16 ± 0.3 (0.63)
Pitch of Sprocket Holes	P <sub>0</sub>	4 ± 0.1 (0.15)
Distance of Compartment to Sprocket Holes	F	7.5 ± 0.1 (0.295)
	P <sub>2</sub>	2 ± 0.1 (0.079)
Distance of Compartment to Compartment	P <sub>1</sub>	12 ± 0.1 (0.472)



**IR REFLOW SOLDERING TEMPERATURE PROFILE**

Note : One Time Reflow Soldering is Recommended.  
Do Not Immerse Device Body in Solder Paste.



Profile Details	Conditions
<b>Preheat</b> - Min Temperature (T <sub>SMIN</sub> ) - Max Temperature (T <sub>SMAX</sub> ) - Time T <sub>SMIN</sub> to T <sub>SMAX</sub> (t <sub>s</sub> )	150°C 200°C 60s - 120s
<b>Soldering Zone</b> - Peak Temperature (T <sub>P</sub> ) - Time at Peak Temperature - Liquidous Temperature (T <sub>L</sub> ) - Time within 5°C of Actual Peak Temperature (T <sub>P</sub> - 5°C) - Time maintained above T <sub>L</sub> (t <sub>L</sub> ) - Ramp Up Rate (T <sub>L</sub> to T <sub>P</sub> ) - Ramp Down Rate (T <sub>P</sub> to T <sub>L</sub> )	260°C 10s max 217°C 30s max 60s - 100s 3°C/s max 6°C/s max
Average Ramp Up Rate (T <sub>smax</sub> to T <sub>P</sub> )	3°C/s max
Time 25°C to Peak Temperature	8 minutes max





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